SOURCING OF SUSTAINABLE SOLID BIOMASS

for large-scale co-firing in NW Europe

international trade of bio-energy commodities

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Rome, Italy

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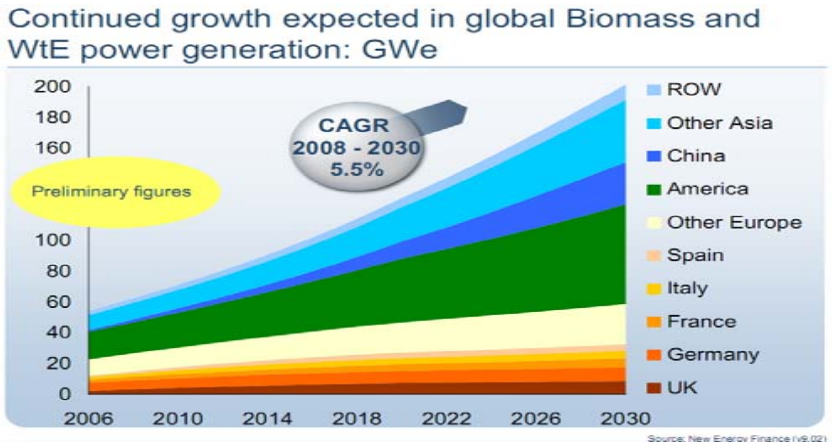
Sr. Officer Regulatory Affairs

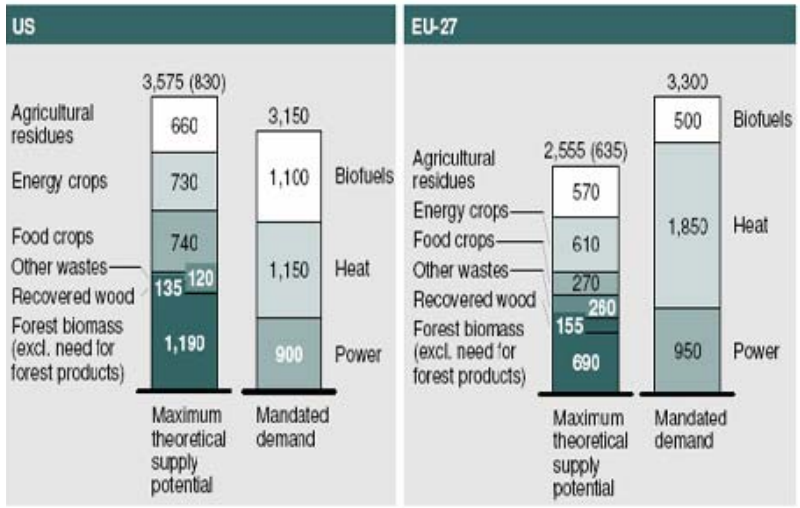
Biomass – A continued global growth is expected

Biomass Potential

- Growth is globally driven by legislation and energy diversification: EU 20% 2020 and Energy bill Obama administration
- Biomass will help to meet EU renewable energy targets as base load power generation -rapid growth until 2020
- Increased international biomass trade is essential for satisfying the growing demand in Europe (EU27) and Japan
- Pellets (and woodchips) of all biomass residues most potential to become a global commodity
- In 2010 some 10 mln tonne of woodpellets were produced globally for bulk supply (co-firing)



Source: Energy Finance



Source: Mc Kinsey Analysis

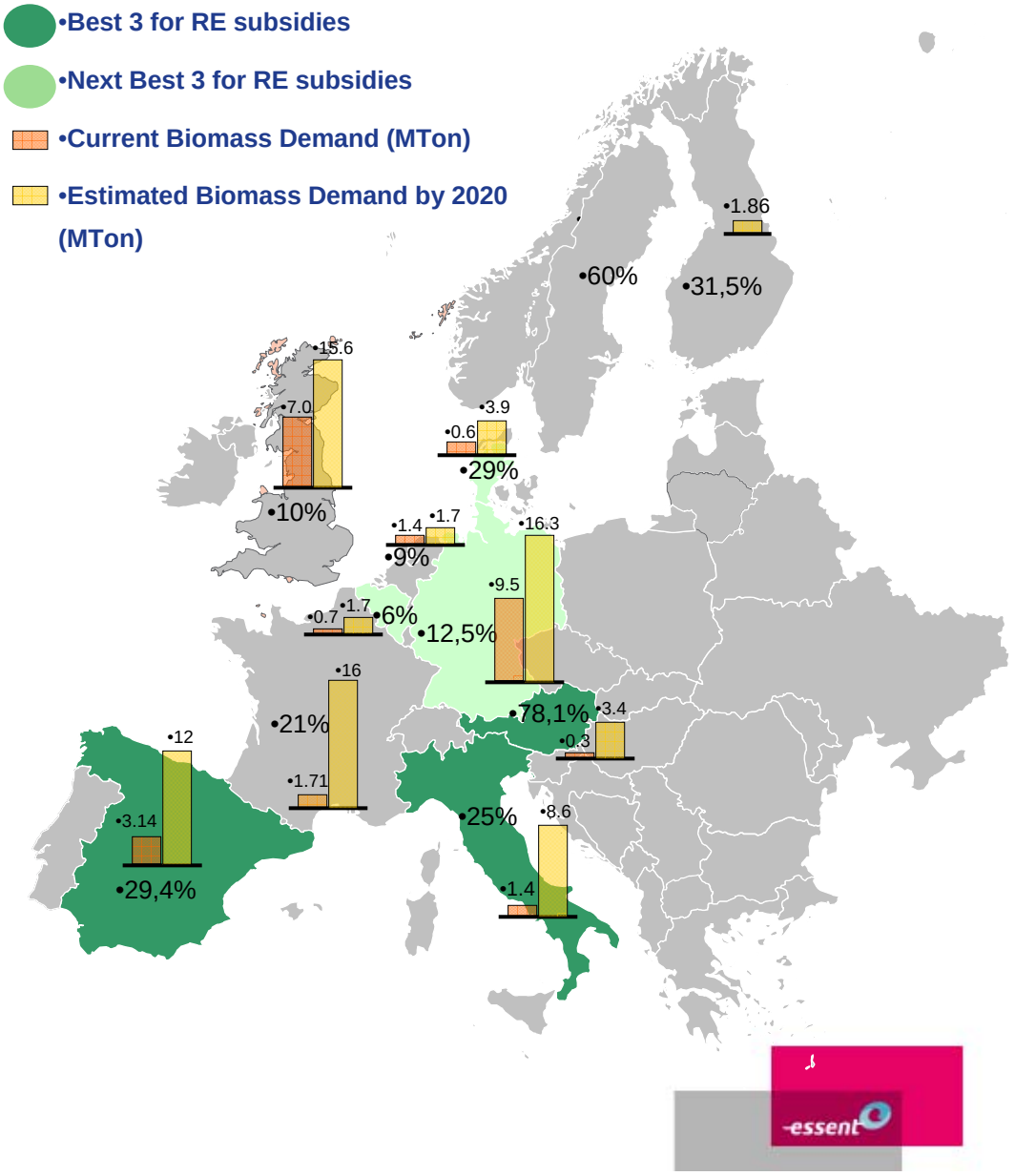
EU Subsidies/targets for Renewable Energy production

Country	€/MWh	Renewable Energy Share Targets	
		2005	2020
Austria	113-157	23%	34%
Spain	108-147	9%	20%
Italy	130	5%	17%
Belgium	90-110	2%	13%
Germany	80-110	6%	18%
Denmark	80	17%	30%
UK	75	1%	15%
NL*	**25-61**	**2%**	**14%**
France	49	10%	23%
Sweden	30	40%	49%
Finland	0	29%	38%

Downstream – Country demand for biomass generation driven by RE subsidies defines target third-party sales market

Demand growth

- As one of the most cost effective RE sources, Biomass generation capacity within EU is likely to triple by 2020 as each countries strive to achieve RE targets
- Spain, Italy and Austria have highest Biomass subsidy level followed by Germany, Belgium and Denmark
- Biomass demand from EU-15 is estimated to grow from current 33MTon per year to over 100 MTon by 2020, when France, Spain, UK, Germany and Italy expected to have highest absolute growth of 45MTon



Copernicus Institute estimates a demand potential of 150 mln tonnes woodpellets in the European Union

Future demand prospects

Universiteit Utrecht

(1 EJ = 10^{18} J)

	Gross Energy Cons.	RES (EJ)	In % of GEC	Wood pellets (mln tonnes)	In % of GEC
Situation 2006	75 EJ	5.4	7.1%		0.1%
- Co-firing				2	
- Heating				4	
Potential future pellet use in 2020	(75 EJ)	15	20%		2.9%
- 15% co-firing	based on J. Hansson (2009)			50	0.97
- 50% heating oil	based on consumption in 2004 (Eurofuel)			100	1.93
- transport fuel				p.m.	p.m.

Copernicus Institute
Research Institute for Sustainable Development and Innovation

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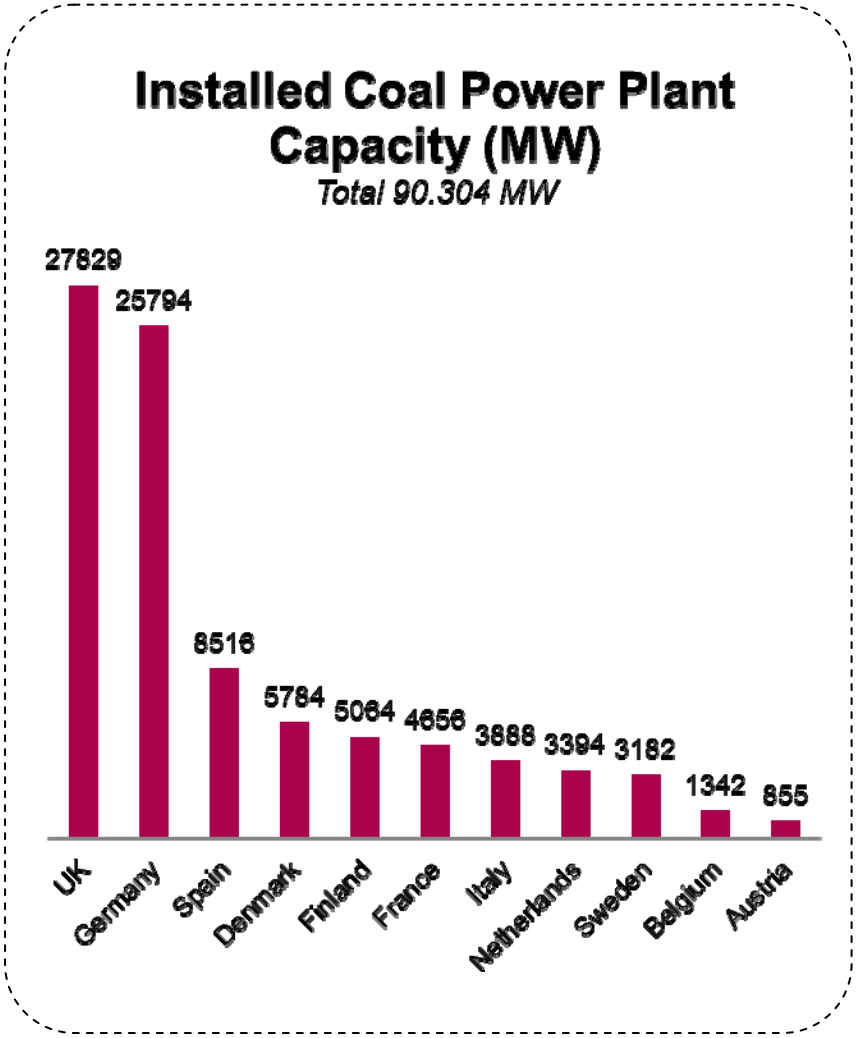
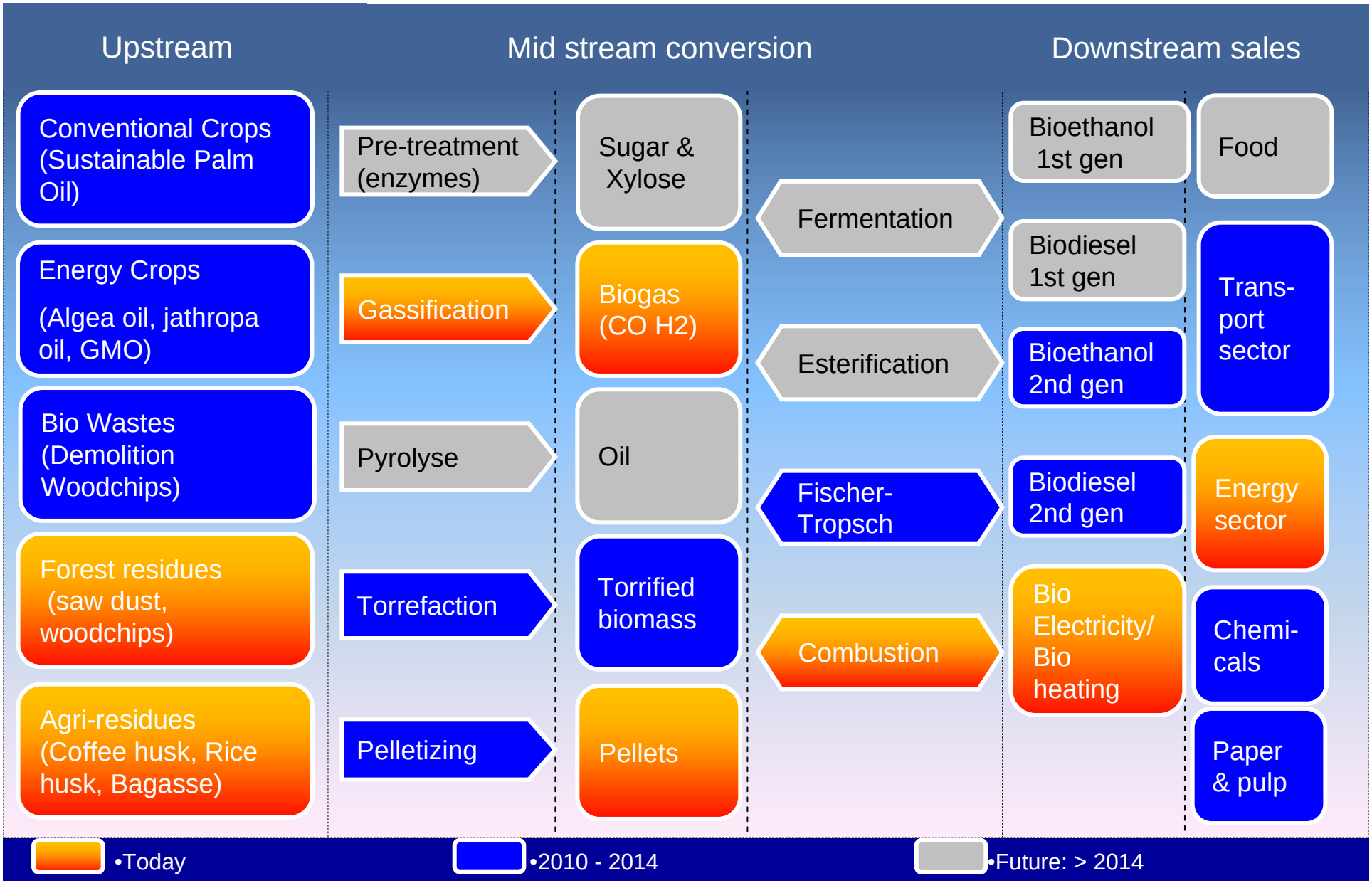
General Analysis Demand Woodpellets in NW Europe

Biomass co-firing

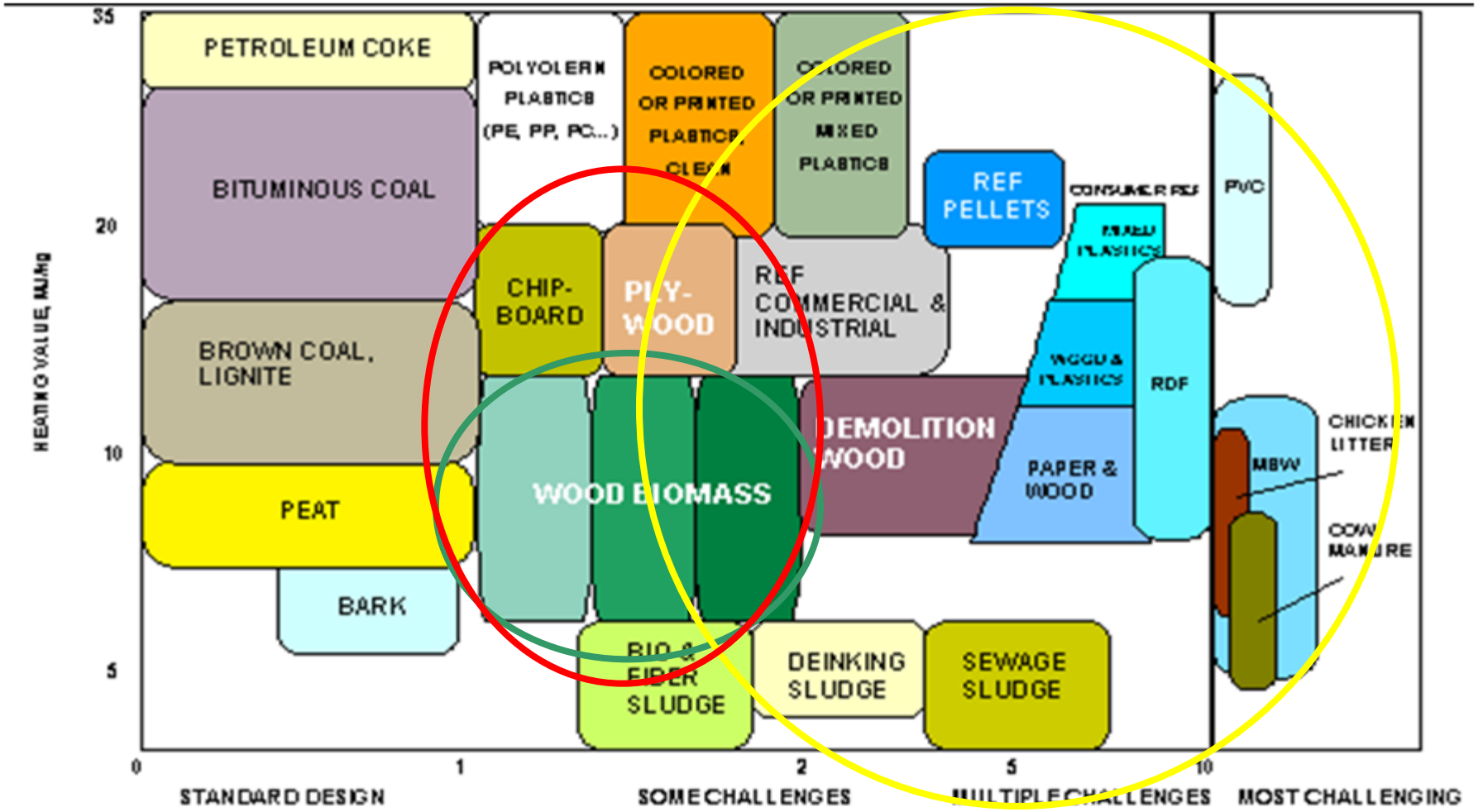
- 14% renewable energy target in the European Union in 2020 (20% Dutch target)
- Co-firing considered essential for meeting 2020 targets
- Assumption: 5% co-firing in existing coal power plants means 33M ton / year needed



Value Chain Opportunities



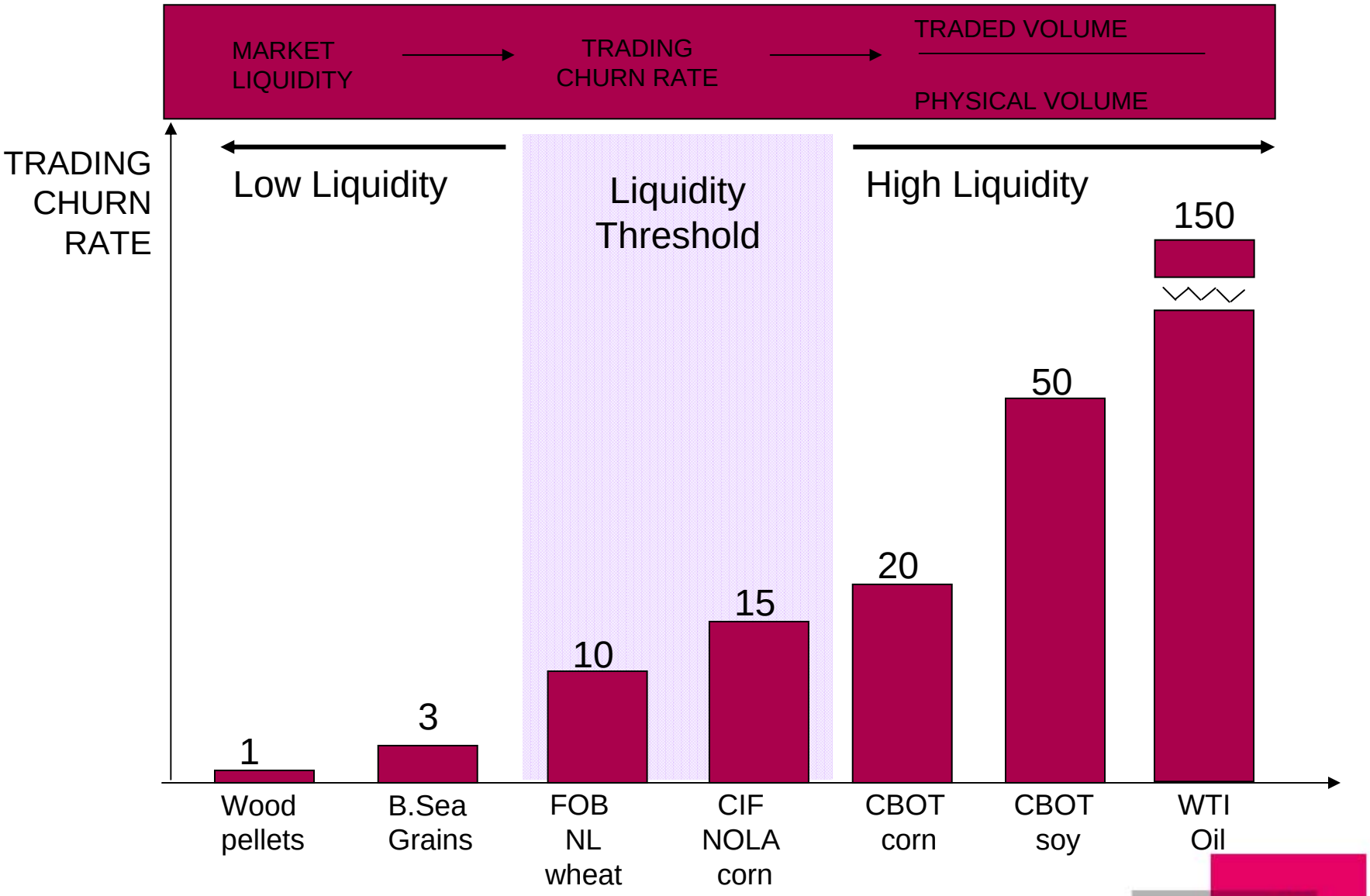
The challenge levels of waste products



Source: FosterWheeler

- •Co-firing
- •Gasification
- •Stand alone unit

Market Liquidity



Woodpellets are the most attractive biomass fuel

Biomass products	GJ/ton	Availability raw material	Export potential to EU due to local demand	EU Experience	Proving sustainability	CIF Rdam €/G J
Bagasse pellets	16	High	Low	No	Risk	9
PKS	16,4	Limited	Low	Limited	Risk	6
PKE	16,5	Medium	Medium	Yes	Risk	6
Rice Husks	16,2	High	Low	No	Low Risk	8
Olive cake / pellets / shells	16,3	Low	Low	Limited	Los Risk	6
Sunflower Husk Pellets	16,5	Low	Low	Limited	Low Risk	8
Peanut Husk Pellets	16,8	Low	Low	Limited	Low Risk	7,5
Woodchips local	9	Medium	Not applicable	Yes	Low Risk	6
Woodchips import	9	Limited	Low	Limited	Low Risk	9
Woodpellets	17	High	High	Yes	Low Risk	7

Demand Analysis Woodpellets

Biomass Co-firing is relatively cost effective

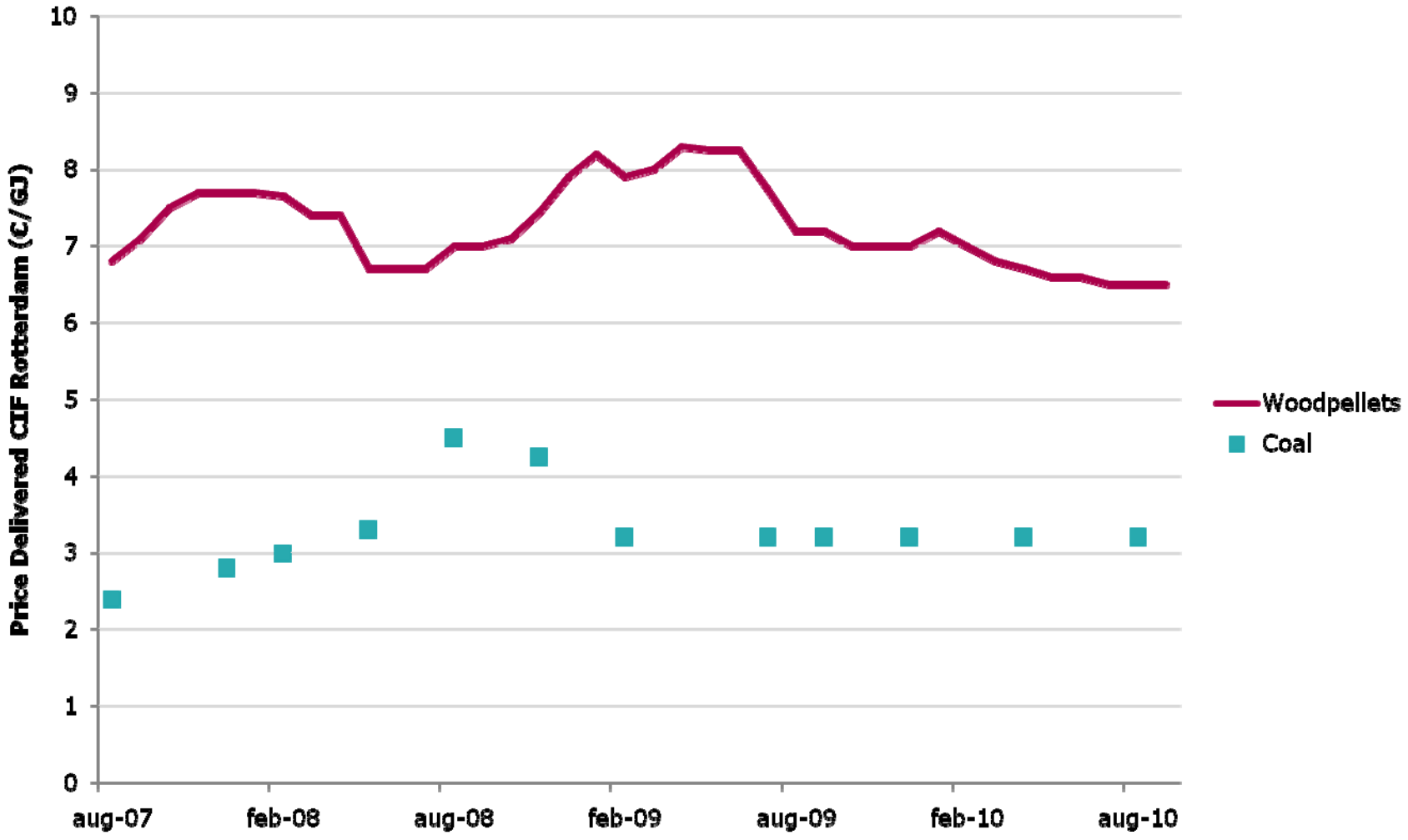
Source: Verkenning Schoon & Zuinig, 2009

Cost including base tariff [€ct/kWh]	2012	2015	2020
Waste to Energy (WtE) *	5.9	6.3	7.7
Wind onshore	8.7	8.7	8.7
Biomass co-firing	**8.1**	**8.9**	**10.3**
Wind offshore	15.9	14.2	11.3
Small-scale biomass **	13.4	14.1	15.4
Hydropower	19.1	20.3	22.4
Solar-PV	47.3	40.2	26.0
Base tariff	6.6	7.0	8.4

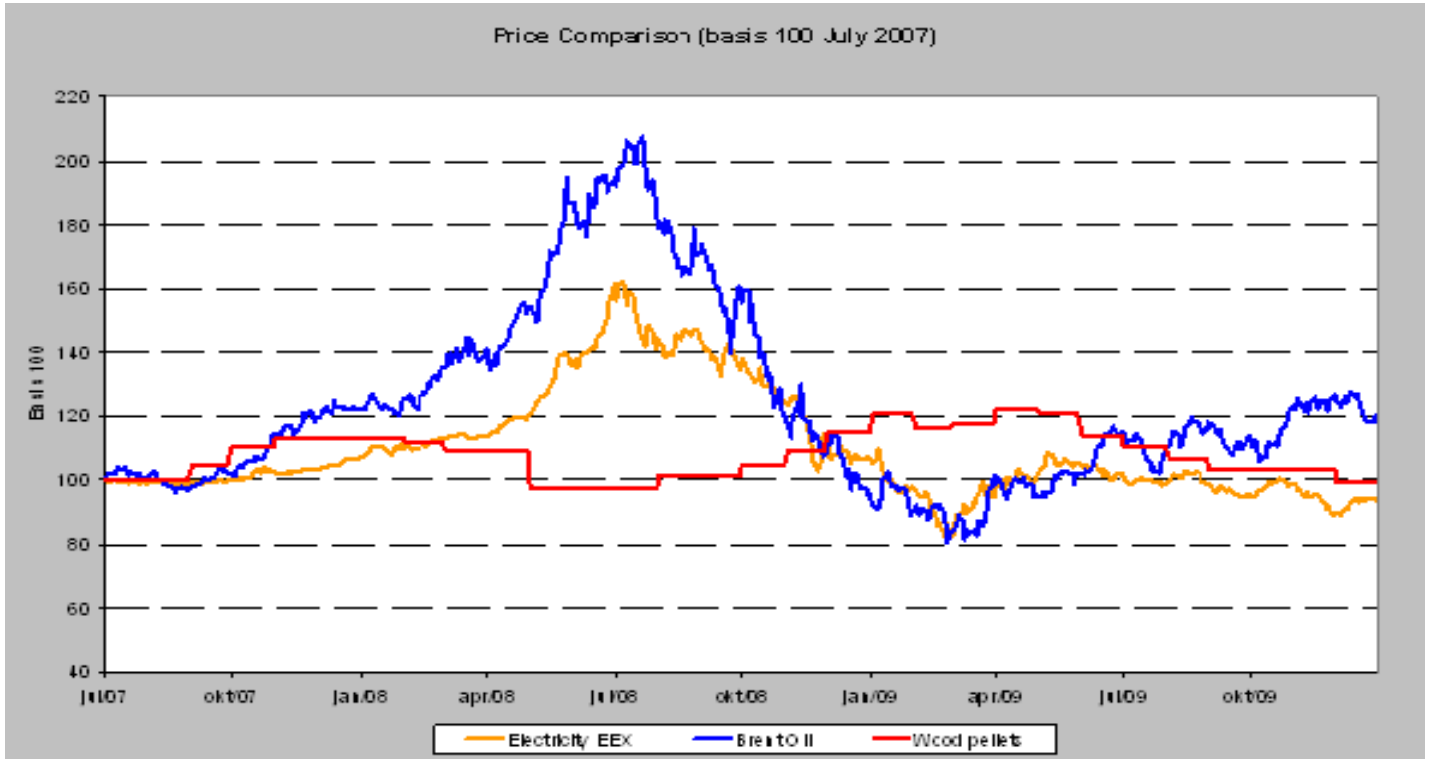
* Cost for WtE only known for 2008 [ECN 2008].

** This is the average of several biomass option [from Verkenning S&Z, 2009]

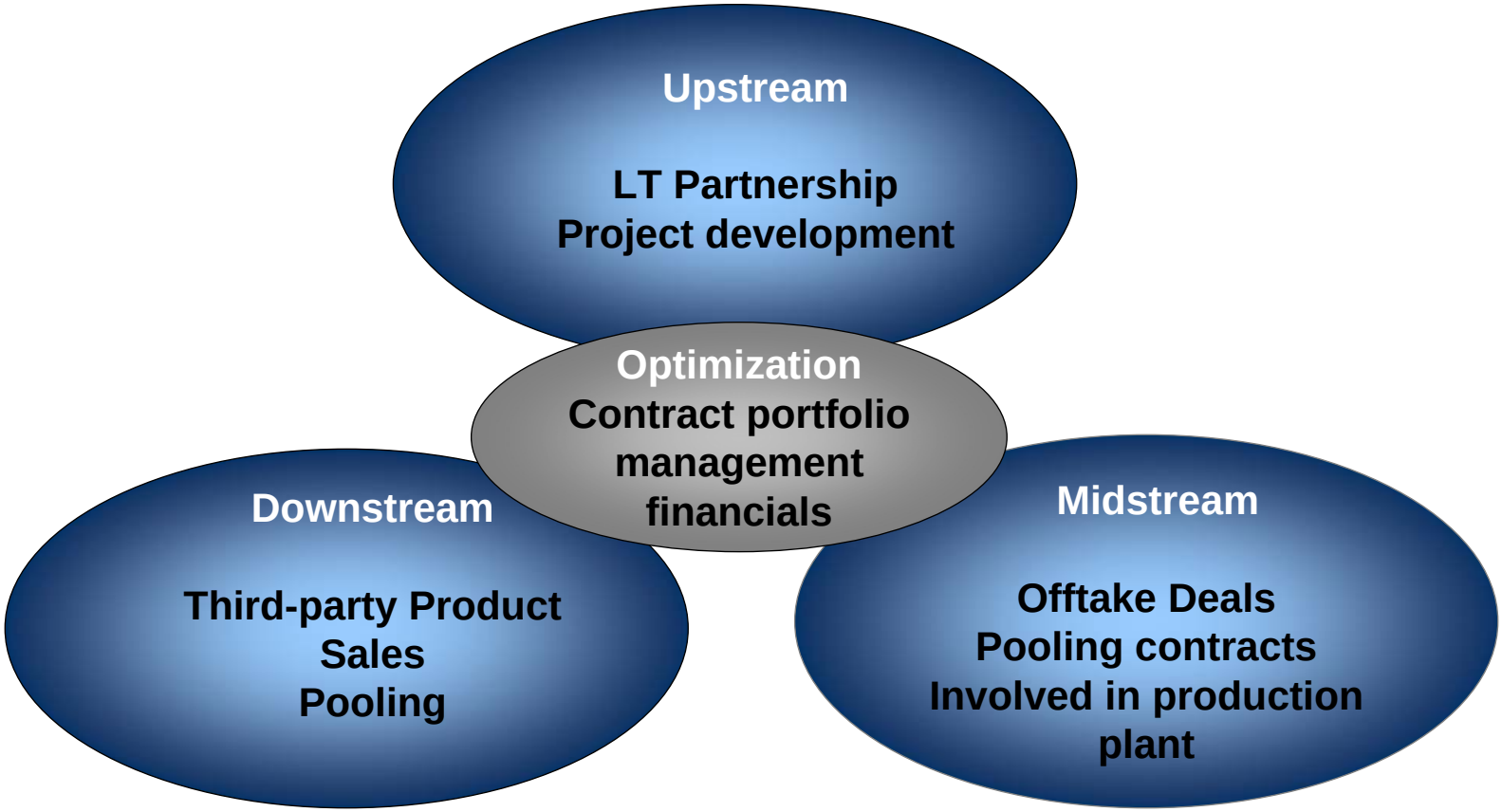
Historical Woodpellet Prices



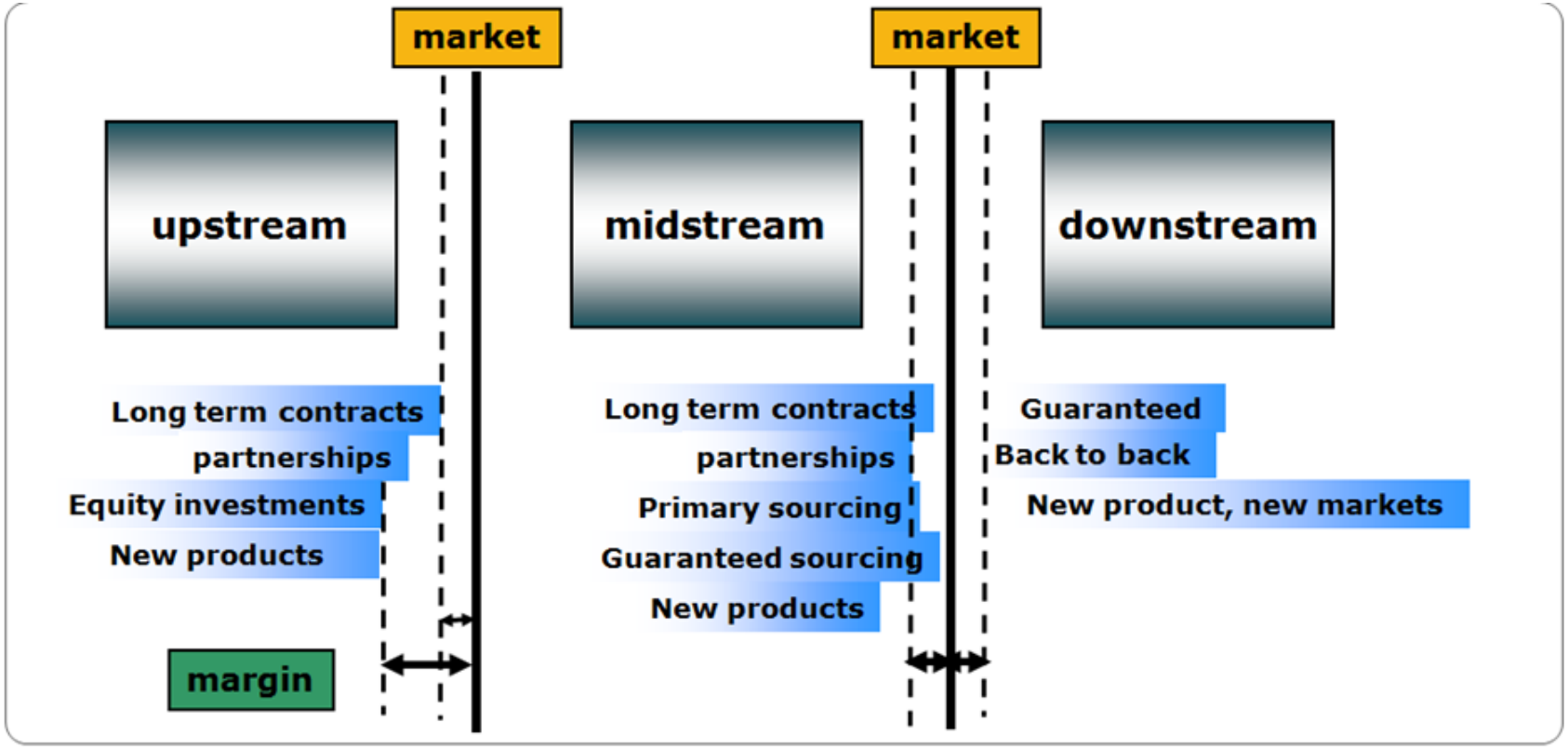
Price Comparison



Biomass strategy in the biomass/biofuels market leads to a clear span of control

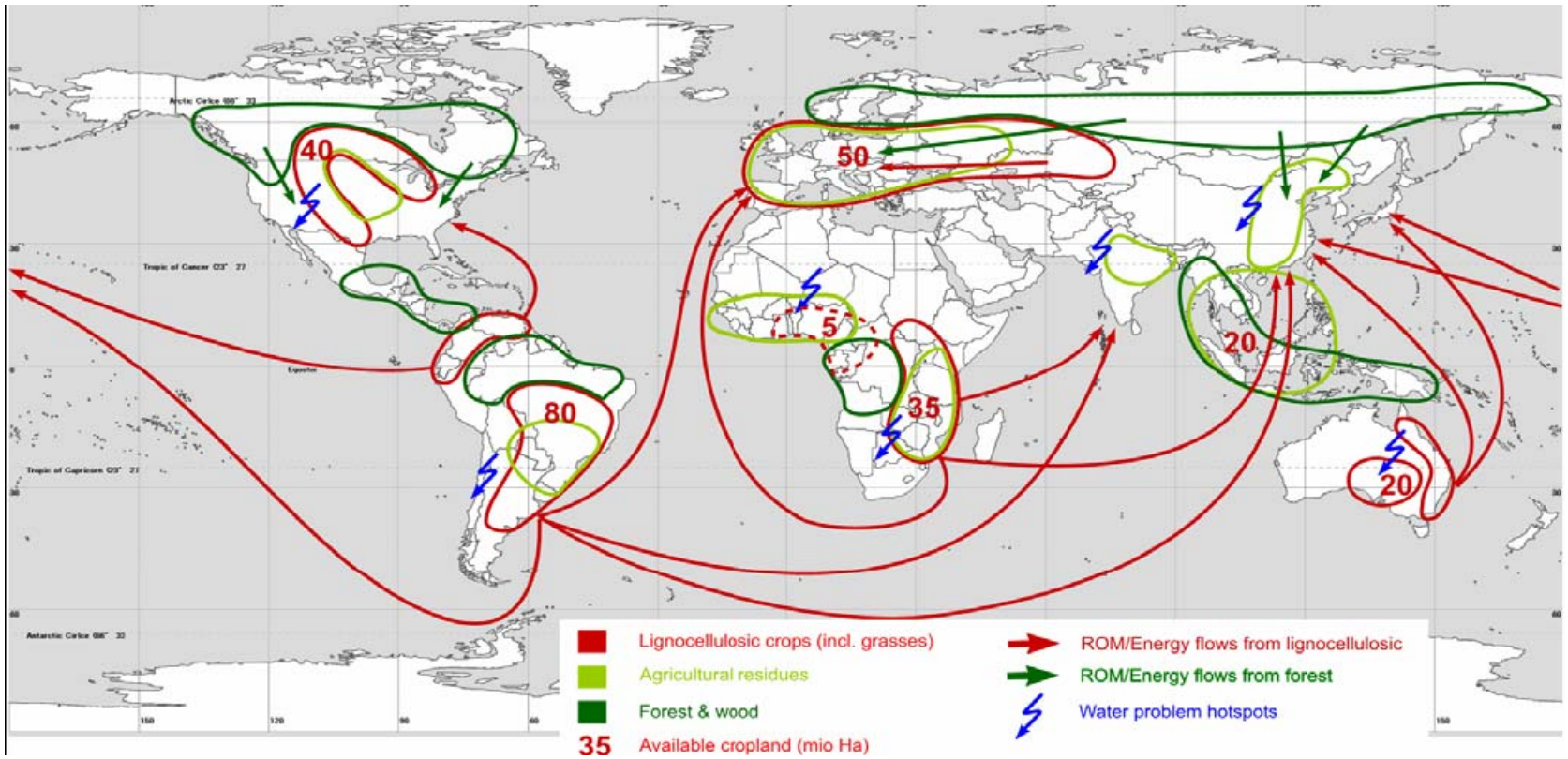


Margins based on market segment expected profit



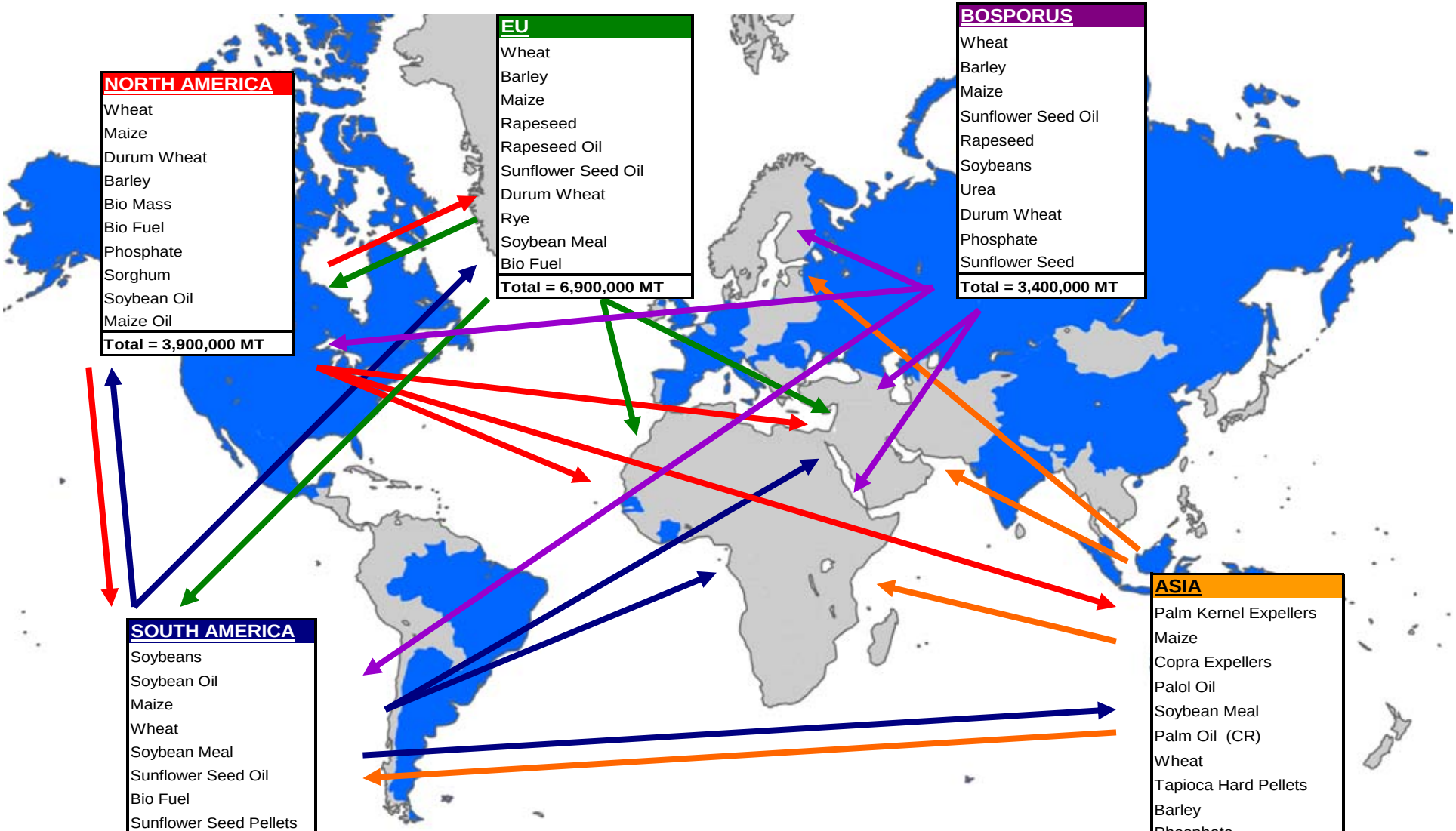
- Handover from upstream to mid/downstream based on market prices
- Margin dependent on type of commitment and maturity and liquidity of market
- Risk involved will set margin; primary vs guaranteed
- Broker fees for back to back deals also taken into account

University Utrecht and IEA indicate Wood and Energy Crops will be significant energy carriers by 2020



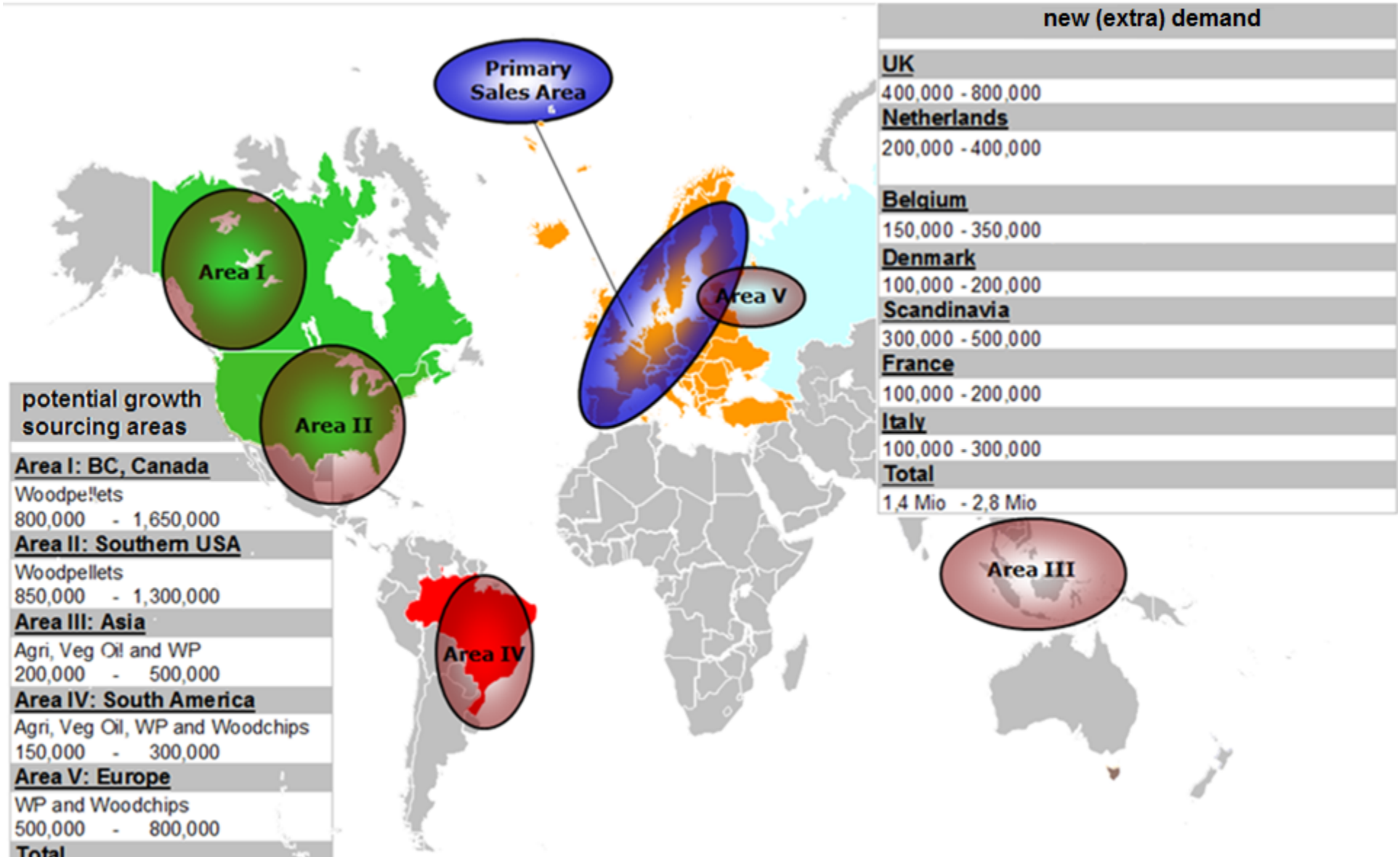
GIRACT FFF Scenario project; Faaij, 2008

Grains & Oilseeds
Trading & Marketing Flows identical with biomass streams



Nidera total traded volume FY 2009: 28 million MT

Potential Volumes in the Market 2010 - 2015



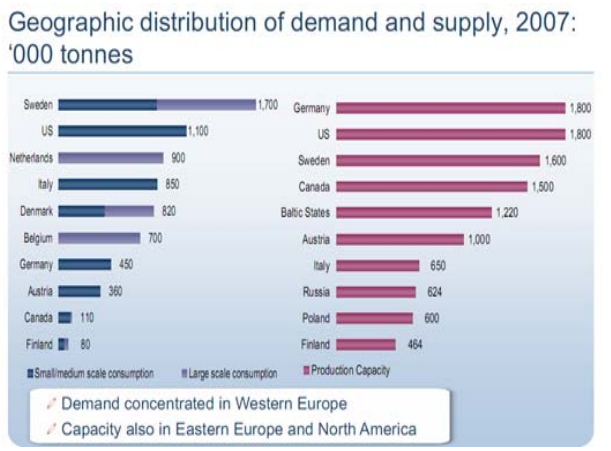
potential growth sourcing areas
Area I: BC, Canada
Woodpellets
800,000 - 1,650,000
Area II: Southern USA
Woodpellets
850,000 - 1,300,000
Area III: Asia
Agri, Veg Oil and WP
200,000 - 500,000
Area IV: South America
Agri, Veg Oil, WP and Woodchips
150,000 - 300,000
Area V: Europe
WP and Woodchips
500,000 - 800,000
Total
2,500,000 - 4,600,000

new (extra) demand
UK
400,000 - 800,000
Netherlands
200,000 - 400,000
Belgium
150,000 - 350,000
Denmark
100,000 - 200,000
Scandinavia
300,000 - 500,000
France
100,000 - 200,000
Italy
100,000 - 300,000
Total
1,4 Mio - 2,8 Mio

Biomass – Pellets Supply and Demand

Supply and demand

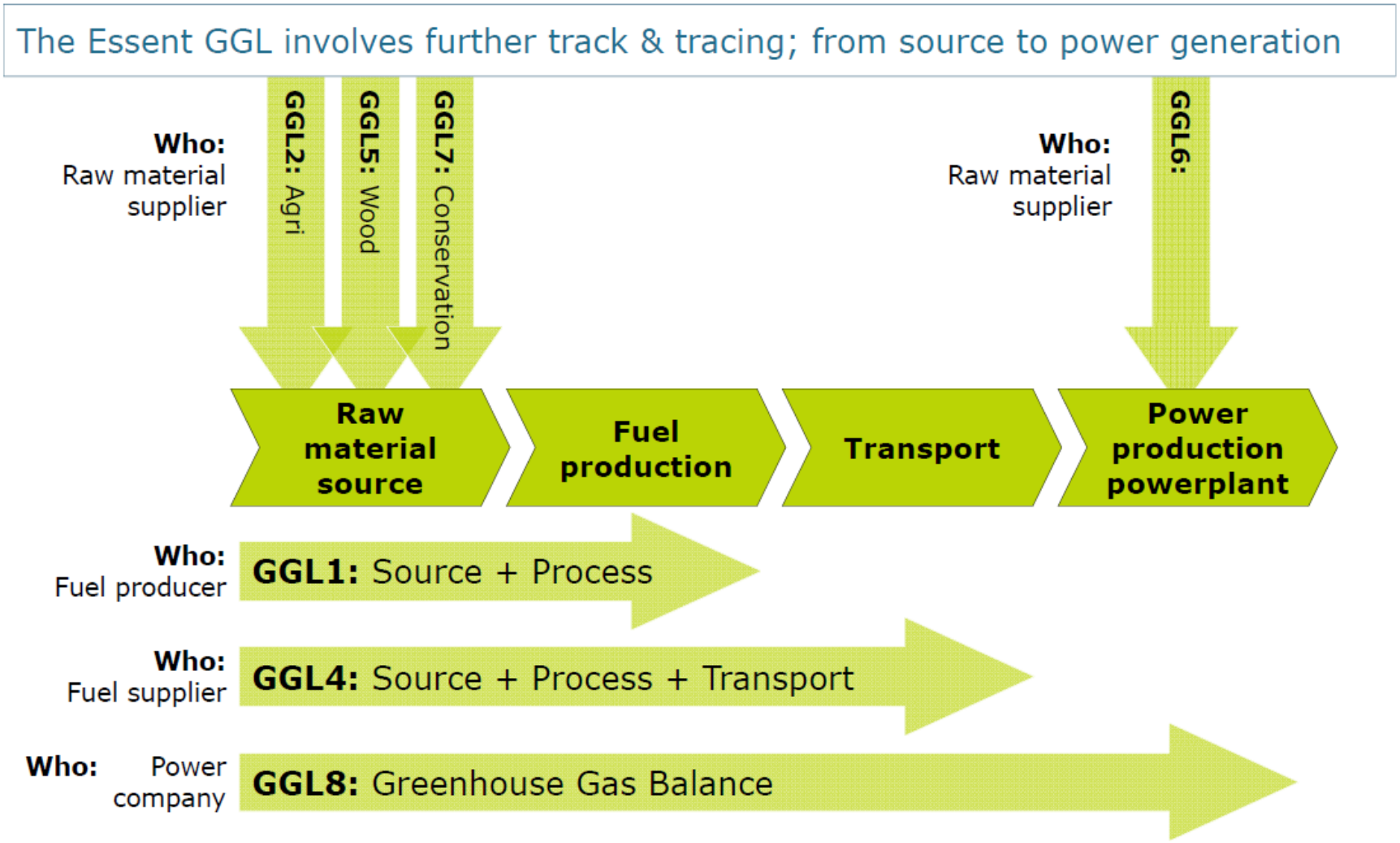
- Demand Concentrated in Western Europe – co-firing in coal fired power plants;
- Feedstock Availability and Prices in EU creates competitive ground for overseas production of pellets;
- Due to nature of current woodpellet market, users of woodpellets want to buy directly from the source
- When the market start trading bigger volumes and specifications become more standardized, direct buying from suppliers will reduce as market is established



Source: Propellets, Bioenergy International

Source: Energy Finance, 2009

The Essent Green Gold Label has evolved over the year



The GGL process can be divided in five different activities

Criteria setting
A multi-stakeholder game resulting in a set of, by those stakeholders accepted, sustainability criteria (example: Cramer criteria set up on the initiative of the Energietransitie Project)

Standards/ Norms setting
Translating criteria into (national or international) standards, norms or agreements (FSC, ISO, CEN, RSPO, NEN-NTA)

Certification System management
A system to check compliance to the standards/norms.
(physical or administrative controls and accreditation of certification bodies)

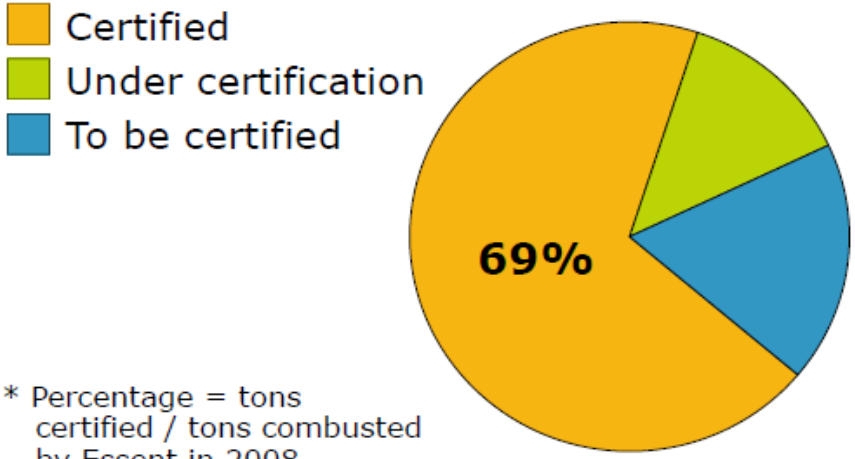
Label / Image management
Providing directives by the company on the application of standards and certification systems to provide evidence for the sustainability of business activities

Execution of Operational activities
Ordering certification bodies to execute audits on business activities (sourcing of biomass) and reporting compliance to the directives of label/image management

Challenges we encounter with certification

- Some suppliers have many small raw material suppliers and tracking tracing not always possible to ultimate source
- As we continuously add new suppliers, we will always have some suppliers "under certification"
- For single (spot) cargoes, full certification is relative large effort and counterparty is not always keen to do their share
- Differences between sustainability standards in Europe cause difficulties in keeping score, our numbers are conservative

Certified Sustainable under GGL *



* Percentage = tons certified / tons combusted by Essent in 2008

Recent years

year	% cert
2006	**33%**
2007	**49%**

What we biomass market really needs to grow….

Biomass to energy is a hot topic, but for large scale growth, the industry will need…

1. **Harmonisation of incentives schemes**
2. **Harmonisation of sustainability criteria**

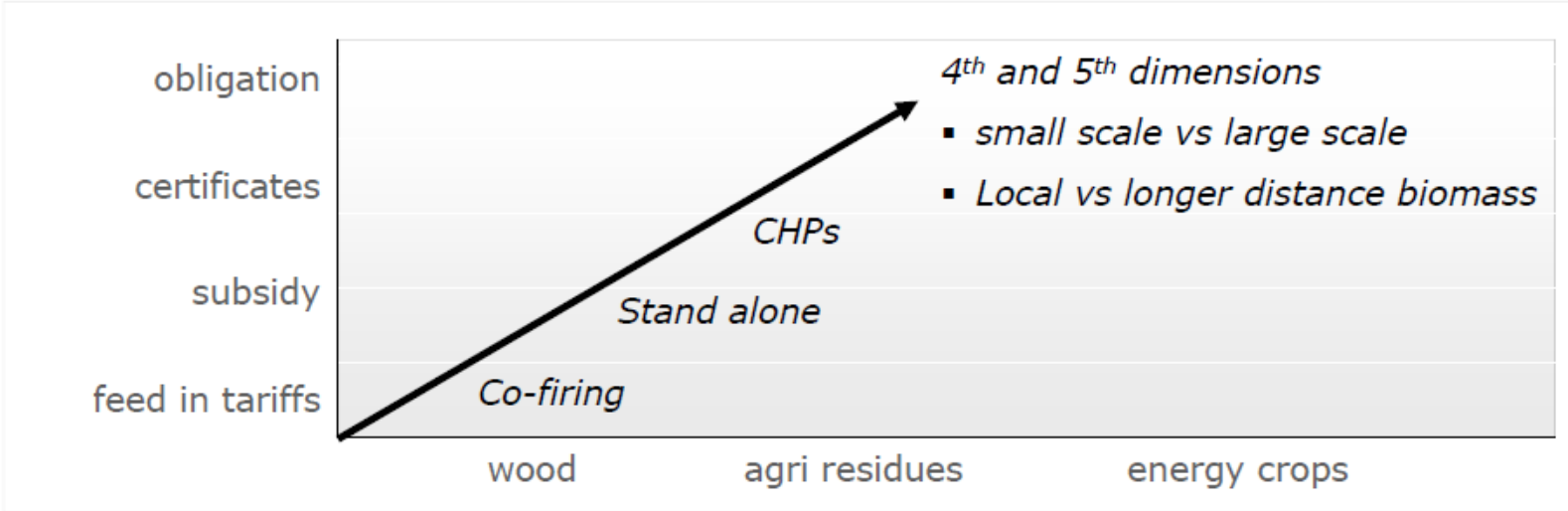
Then the utilities will find ways to solve technical issues like Essent has learned to do. And with…

3. **Technical development to 2nd generation biomass (like bio coal)**

…the technical issues at power plants will be easier or kicking in at higher co-firing levels.

Harmonisation of EU incentives needed to stimulate growth

Every country has created its own incentive scheme along multiple dimensions



Leading to different forms of biomass initiatives per country. As example: in the Netherlands co-firing of agri residues is not attractive but wood pellets are, while in the UK it is close to the opposite.

Combined with frequent changes in incentives schemes, investors are left uncertain as to which combination will be best long term investment.

Harmonisation of sustainability standards would stimulate growth by enabling trading

Each country has defined different criteria no sustainability…
…and many market players have voluntary created its own internal sustainability standards

There are large overlap on main criteria such as:

- GHG balance,
- Alternative use of the material,
- bio diversity,
- impact in origination country on air, water, soil,
- economic prosperity
- well being.

But significant differences in;

- level of detail required
- Control method (certification or reporting)

This makes it very impractical to trade biomass and as such is hindering biomass to become a mature energy commodity.

Essent looking to join forces on certification

- Although we are proud of our Green Gold label, we are not married to having our own proprietary label. To the contrary, we are very keen to join forces with other market players.
- Everybody is welcome to use our Green Gold Label and we are equally open to adopt other standards.
- Are you willing work with us towards an independent sustainability standard that is available to the whole market? Then please contact our contact person
- Jacob Rookmaker at jacob.rookmaker@essent.nl